NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

Structure for Water Control
(No.)
No. 587

Definition

A structure in an irrigation, drainage, or other water management system that conveys water, controls the direction or rate of flow, or maintains a desired water surface elevation.

Purpose

To control the stage, discharge, distribution, delivery, or direction of flow of water in open channels or water use areas. Also used for water quality control, such as sediment reduction or temperature regulation. These structures are also used to protect fish and wildlife and other natural resources.

Conditions Where Practice Applies

This practice applies wherever a permanent structure is needed as an integral part of an irrigation, drainage, or other water-control system to serve one or more of the following functions:

1. To conduct water from one elevation to a lower elevation within, to, or, from a ditch, channel, or canal. Typical structures: drops, chutes, turnouts, surface water inlets, head gates, pump boxes, and stilling basins.

2. To control the elevation of water in drainage or irrigation ditches. Typical structure: checks.

3. To control the division or measurement of irrigation water. Typical structures: division boxes and water measurement devices.

4. To keep trash, debris, or weed seeds from entering pipelines. Typical structure: debris screens.

5. To control the direction of channel flow resulting from tides and high water or backflow from flooding. Typical structure: tide and drainage gates.

6. To control the level of a water table or to remove surface or subsurface water from adjoining land, to flood land for frost protection or to manage water levels for wildlife or recreation. Typical structures: water level control structures, pipe drop inlets, and box inlets.

7. To provide water control for recreation or similar purposes.

8. To convey water over, under, or along a ditch, canal, road, railroad, or other barriers. Typical structures: bridges, culverts, flumes, inverted siphons.

9. To modify water flow to provide habitat for fish, wildlife, and other aquatic animals. Typical structures: deflectors, chutes, cold water release, or structures to make pools and riffles.

Federal, State, and Local Laws[1]

Design and construction activities shall comply with all federal, state, and local laws, rules, and regulations governing pollution abatement, health, and safety. The owner or operator shall be responsible for securing all required permits or approvals and for performing in accordance with such laws and regulations. NRCS employees are not to assume responsibility for procuring these permits, rights, or approvals, or for enforcing laws and regulations. NRCS may provide the landowner or operator with technical information needed to obtain the required rights or approvals to construct, operate, and maintain the practice.

Permits may be required from the following agencies:

1. West Virginia Department of Health

2. West Virginia Department of Agriculture

Planning Considerations

Water Quantity

1. Effects on the water budget, especially on volumes and rates of runoff, infiltration, evaporation, transpiration, deep percolation, and ground water recharge.

2. Potential for a change in the rate of plant growth and transpiration because of changes in the volume of soil water.

3. Effects on downstream flows or aquifers that would affect other water uses or users.

4. Effects on the volume of downstream flow that might cause environmental, social or economic effects.

5. The effect on the water table of the field to ensure that it will provide a suitable rooting depth for the anticipated crop.

6. Potential use for irrigation management to conserve water.

Water Quality

1. Effects on erosion and the movement of sediment and soluble and sediment-attached substances carried by runoff.

2. Effects on the movement of dissolved substances below the root zone and to ground water.

3. Short term and construction-related effects on the quality of downstream water.

4. Effects of water level control on the temperatures of downstream waters for their effects on aquatic and wildlife communities.

5. Effects on wetlands or water-related wildlife habitats.
6. Effects on the visual quality of downstream water resources.

Design Criteria

Structures shall be designed on an individual job basis, or applicable NRCS standard drawings shall be adapted, to meet site conditions and functional requirements. They shall be part of an approved comprehensive engineering plan for irrigation, drainage, wildlife, recreation, channel improvement, or similar purposes.

The plan shall specify the location, grades, dimensions, materials, and hydraulic and structural requirements for the individual structure. Provisions must be made for necessary maintenance. Care must be used to insure that the area's visual resources are not damaged. If watercourse fisheries are important, special precautions or design features may be needed to insure continuation of fish migrations.

If soil and climatic conditions permit, a protective cover of vegetation shall be established on all disturbed earth surfaces. If soil or climatic conditions preclude the use of vegetation and protection is needed, nonvegetative means, such as mulches or gravel, may be used. In some places, temporary vegetation may be used until permanent vegetation can be established. The structure can be fenced, if necessary, to protect the vegetation. Seedbed preparation, weeding, fertilizing, and mulching shall comply with the appropriate practice standards.

Site Investigation

Adequate investigation shall be made to insure that:

1. The structure site is stable and when the planned work of improvement is installed will perform as intended.

2. The design can be developed incorporating features which will accomplish the purpose intended giving consideration to adjacent land uses and improvements.

3. The water supply is available and adequate.

Reservoir Areas

For waterfowl developments, a minimum of 20 percent (50 percent is preferred) of the pool area shall be 3 1/2 feet deep or deeper. No more than 10 percent of the reservoir shall be 8 feet deep or deeper. A NRCS

biologist shall be consulted in the planning of any site with a reservoir area 10 acres or more.

Hydrology

Peak flow and volume determination shall be by approved NRCS methods.

Hydraulics

The capacity of structures shall be based upon established NRCS methods.

The minimum spillway capacities shall be in accordance with those contained in the standard for Grade Stabilization Structure (410). Mechanical spillways shall be used when flow is expected frequently or will occur for a duration of several days. Earth spillways may be used where vegetation can be established and maintained. Natural rock spillways may be used when it is durable under exposure to varying water and temperature extremes.

Structural

The structural design and quality of material shall have a life expectancy consistent with the design frequency but in no case less than 10 years. The structural design shall be based upon the local site conditions. Variable crest spillways (stop logs in inlets or control boxes) shall be considered in the design whenever practical to permit regulation of water levels. The high crest of mechanical spillways shall be at least 0.5 foot below the crest of the earth spillway.

Earth Embankment

The design and construction of earth embankments shall conform with the practice standard for Earth Embankment (377).

Other

The State Conservation Engineer shall be consulted for the criteria to be applied to the design of structures where guides are not established.

Plans and Specifications

Plans and specifications for installing structures for water control shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose.

Operation and Maintenance

An operation and maintenance plan shall be developed for the specific structures in the water management system. The plan shall include those measures necessary to insure that the system functions for its intended life.

[1]Bold italics is information added to the National standard by West Virginia.